



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/772,102	02/04/2004	Subject Kumar	2950.21US02	4854

7590 03/18/2005

Patterson, Thunte, Skaar & Christensen, P.A.  
4800 IDS Center  
80 South 8th Street  
Minneapolis, MN 55402-2100

EXAMINER
----------

KOSLOW, CAROL M

ART UNIT	PAPER NUMBER
----------	--------------

1755

DATE MAILED: 03/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/772,102

Applicant(s)

KUMAR, SUJEET

Examiner

C. Melissa Koslow

Art Unit

1755

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 18 January 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-14 and 16-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-14 is/are allowed.
- 6) ☒ Claim(s) 16-22 and 24-26 is/are rejected.
- 7) ☒ Claim(s) 23 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

*ve*

Art Unit: 1755

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 8 January 2005 has been entered.

The amendments to the claims have overcome the rejections based on U.S. patents 4,478,800; 6,447,577 and 6,090,200. Applicant's arguments with respect to the remaining rejection have been fully considered but they are not persuasive.

The abstract of the disclosure is objected to because it is directed to oxide particles, not the claimed sulfide particles. Correction is required. See MPEP § 608.01(b).

Claims 16 and 17 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention.

The added limitation that the powders are stirred during the contacting step where the oxide powder is converted to a sulfide powder is not found in the specification and thus is new matter. Applicants' point to page 19, line 28 through page 20, line 7 to support this addition, but this teaching is the apparatus used in the process of heat treating the oxide particles to modify the properties of the oxide particles, as can be seen the preceding paragraphs. The claimed process is taught on page 22, lines 2-9 and this section is silent as to the apparatus used in the conversion and there is no teaching of

Art Unit: 1755

stirring. It is noted that there are no examples of the claimed process which could be used to support the stirring claim limitation.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 18, 20, 21 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. patent 6,699,409.

This reference teaches rare earth doped metal chalcogenide phosphor nanoparticles, where the metal is La or a Group II metal (col. 6, lines 5-10), which includes metal sulfides, such as strontium sulfide. The amount of rare earth dopant is up to 60 mol%, which overlaps the claimed range. Product claims with numerical ranges which overlap prior art ranges were held to have been obvious under 35 USC 103. *In re Wertheim* 191 USPQ 90 (CCPA 1976); *In re Malagari* 182 USPQ 549 (CCPA 1974); *In re Fields* 134 USPQ 242 (CCPA 1962); *In re Nehrenberg* 126 USPQ 383 (CCPA 1960). The nanosized particles have a size in the range of 1-100 nm (claim 13), which overlaps the claimed range. This reference suggests the claimed collection of particles.

Applicants' argue the reference does teach the claimed particles because the reference does not teach the particle size of taught nanosized nanoparticles and that the taught crystallites are different from the nanosized nanoparticles. From reading the specification and the fact that in nanotechnologies, the term "crystallite" is sometimes used to refer the particles, as shown by column 1, lines 15-18 in U.S. patent 6,117,363, column 1, lines 45-54 of U.S. patent 6,319,426 and column 6, lines 30-34 of U.S. patent 6,379,635; it is clear that the crystallites in the reference are the particles. Even if they are not, the reference teaches nanosized particles, which means the particles have a size of

Art Unit: 1755

less than 1 micron. Accordingly, the reference teaches particles whose size overlaps the claimed range.

Applicants also argue the reference does not teach any specific sulfides nor the method for making sulfides and thus there is no reasonable expectation of success. With respect to this argument, the reference clearly teaches rare earth doped metal chalcogenide, where the metal is La or a Group II metal and it teaches in column 6, lines 11-15 that the methods for producing these material are well known. One of ordinary skill in the art would be expected to know that a metal sulfide is a type of metal chalcogenide. These arguments are not convincing and the rejection is maintained.

Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over WO 00/66485.

This reference teaches making tungsten sulfide nanotubes by tungsten oxide powder, having an average particle size of at most 300 nm, with H<sub>2</sub>S at 800-850°C to form a powder of tungsten sulfide nanotubes having a length of 0.2-20 microns (pg. 2, line 9-pg. 4, line 7). The taught size overlaps the claimed particle size range. Example 1 teaches producing a nanotube powder having a length in the range of 200-500 nm from oxide powder having a size of about 40 nm. The taught temperature range is less than the melting point of both tungsten oxides and tungsten sulfides. While the reference does not teach the reaction occurs with stirring, one of ordinary skill in the art would have found it obvious to stir during the reaction to ensure all the particles are exposed to the dihydrogen sulfide gas. The reference suggests the claimed process.

Claims 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. patent 5,279,801.

Art Unit: 1755

This reference teaches producing rare earth or transition metal sulfide particles by contacting the metal oxide particles with CS<sub>2</sub> at 300-800°C, which is below the melting point of rare earth or transition metal sulfides and oxide and overlaps the range of claim 17. The metal oxide particles have a size in the range of 100 nm to 100 microns, which overlaps the claimed range. It is known in the art that sulfurizing does not change the size of the particle being sulfurized. While the reference does not teach the reaction occurs with stirring, one of ordinary skill in the art would have found it obvious to stir during the reaction to ensure all the particles are exposed to the carbon disulfide gas. The reference suggests the claimed process.

Claims 16, 18, 21, 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. patent 6,039,894.

This reference teaches producing metal sulfide phosphor particles, where the metal is zinc, zinc and cadmium, strontium or calcium, by contacting the metal oxide precursor particles with dihydrogen sulfide gas (table 1) in a fluidized bead reactor, which means the particles are stirred by the gas, at 500-900°C. This temperature range is below the melting points of the taught oxides and sulfides. The taught calcium and strontium sulfides are doped with rare earth metals, such as europium and samarium. Thus the reference teaches a collection of rare earth doped strontium or calcium sulfide particles, where the rare earth metal comprises europium. Column 10, lines 46-60 teach the particle size of the phosphor is essentially the same as that of the precursor particles. Column 11, lines 2-3 teaches the phosphor particles, and accordingly the precursor particles, can have a size of 100 nm up to 1 micron. This means the average particle size

Art Unit: 1755

is also in this range. These particles overlap the ranges in claims 16, 18 and 21. The reference suggests the claimed process and particles.

Claims 16, 18-22 and 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. patent 6,645,398.

This reference teaches a collection of metal sulfide phosphor particles having an average particle size in the range of about 100 nm up to about 5 microns, where at least 95 % of the particles are not larger than 1.5 times the average particle size (col. 38, lines 1-25). Thus the taught average size range and maximum size range overlaps the claimed ranges. Column 35, line 29 through column 36, line 20 and table 1 teaches the metal sulfide can be rare earth doped metal sulfide, where amount of dopant is 0.02-15 at%, which is the same as mole percent in phosphors. This range overlaps the claimed range. The exemplified sulfides include cerium doped strontium sulfide, europium doped calcium and/or strontium sulfide and rare earth metal doped zinc sulfide. Column 37, lines 41-50 teaches the sulfide particles can be produced by contacting a metal oxide powder with dihydrogen sulfide at 800-1100°C, which is below the melting point of the taught oxides and sulfides. The taught oxides particles are produced by the spray conversion process discussed in the reference, which means the oxides have having an average particle size in the range of about 100 nm up to about 5 microns, which overlaps the claimed range. While the reference does not teach the reaction occurs with stirring, one of ordinary skill in the art would have found it obvious to stir during the reaction to ensure all the particles are exposed to the carbon disulfide gas. The reference suggests the claimed process and particles.

Claims 1-14 are allowed for the reasons given in the previous actions.

Art Unit: 1755

Claim 23 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

There is no teaching or suggestion in the cited art of record of a collection of rare earth doped metal/metalloid sulfide particles having an average particle size in the range of about 35 nm to about 250 nm and where at least 95% of the particles have a diameter greater than 40% of the average particle size and less than 225% of the average particle size. There is no suggestion in the art of the claimed lower limit of the size distribution.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Melissa Koslow whose telephone number is (571) 272-1371. The examiner can normally be reached on Monday-Friday from 8:00 AM to 3:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorenzo, can be reached at (571) 272-1233.

The fax number for all official communications is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

cmk  
March 11, 2005

  
C. Melissa Koslow  
Primary Examiner  
Tech. Center 1700